

# Supporting Data

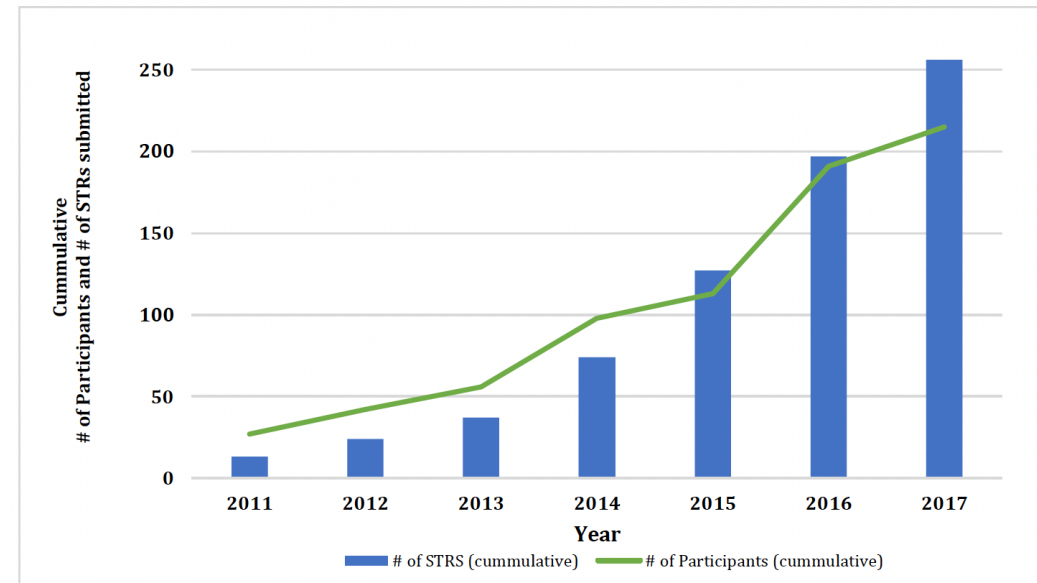
# Data tables from 2019 FIP Update

**Table 1. The 2018 Academic Research Fleet Composition.**

| Ship/Class                      | Owner   | Operator | Length-Over-All (m [ft]) | Delivered (y) | Projected End of Service (y) |
|---------------------------------|---------|----------|--------------------------|---------------|------------------------------|
| <b>Global Class</b>             |         |          |                          |               |                              |
| <i>RV Thomas G. Thompson</i>    | Navy    | UW       | 84 [274]                 | 1991          | 2036                         |
| <i>RV Roger Revelle</i>         | Navy    | SIO      | 84 [274]                 | 1996          | 2041*                        |
| <i>RV Atlantis</i>              | Navy    | WHOI     | 84 [274]                 | 1997          | 2042*                        |
| <i>RV Sikuliaq</i>              | NSF     | UAF      | 80 [261]                 | 2014          | 2045                         |
| <i>RV Marcus G. Langseth</i>    | NSF     | LDEO     | 71 [235]                 | 1991          | 2020                         |
| <b>Ocean/Intermediate Class</b> |         |          |                          |               |                              |
| <i>RV Kilo Moana</i>            | Navy    | UH       | 57 [186]                 | 2002          | 2032                         |
| <i>RV Neil Armstrong</i>        | Navy    | WHOI     | 73 [238]                 | 2015          | 2045                         |
| <i>RV Sally Ride</i>            | Navy    | SIO      | 73 [238]                 | 2015          | 2046                         |
| <i>RV Endeavor</i>              | NSF     | URI      | 56 [184]                 | 1976          | 2021                         |
| <i>RV Oceanus</i>               | NSF     | OSU      | 54 [177]                 | 1976          | 2020                         |
| <i>RV Atlantic Explorer</i>     | BIOS    | BIOS     | 51 [168]                 | 1982          | 2026                         |
| <b>Regional Class</b>           |         |          |                          |               |                              |
| <i>RV Hugh R. Sharp</i>         | UDel    | UDel     | 44 [146]                 | 2005          | 2035                         |
| <b>Coastal/Local Class</b>      |         |          |                          |               |                              |
| <i>RV Robert Gordon Sproul</i>  | SIO     | SIO      | 38 [125]                 | 1981          | 2023                         |
| <i>RV Pelican</i>               | LUMCON  | LUMCON   | 35 [116]                 | 1985          | 2020                         |
| <i>RV Walton Smith</i>          | UMiami  | UMiami   | 30 [96]                  | 2000          | 2030                         |
| <i>RV Savannah</i>              | SkIO/UG | SkIO/UG  | 28 [92]                  | 2001          | 2031                         |
| <i>RV Blue Heron</i>            | UMinn   | UMinn    | 26 [86]                  | 1985          | 2025                         |
| <i>RV Rachel Carson</i>         | UW      | UW       | 22 [72]                  | 2003          | 2033                         |

\*RV Revelle and the RV Atlantis service-life extensions are anticipated after completion of the mid-life refit programs to begin in 2019 and 2020.

UNOLS works with funding agencies and vessel operators to provide a variety of activities aimed at developing skills for students, early career scientists and chief scientist training. Since the beginning of the Chief Scientist Training Cruises in 2011, there have been 21 cruises on 11 different vessels through 2018. The vessels range from global vessels, intermediate ships, and regional and local ships. A recent example is the Chief Scientist Training cruise on the RV *Atlantis* with *Alvin/Sentry* in December 2018 to the East Pacific Rise with 10 berths dedicated to primarily new scientists and post docs. The Chief Scientist Training Workshops reached 215 participants for 2011-2017, for which there were 250 ship time requests submitted (Fig. 5).

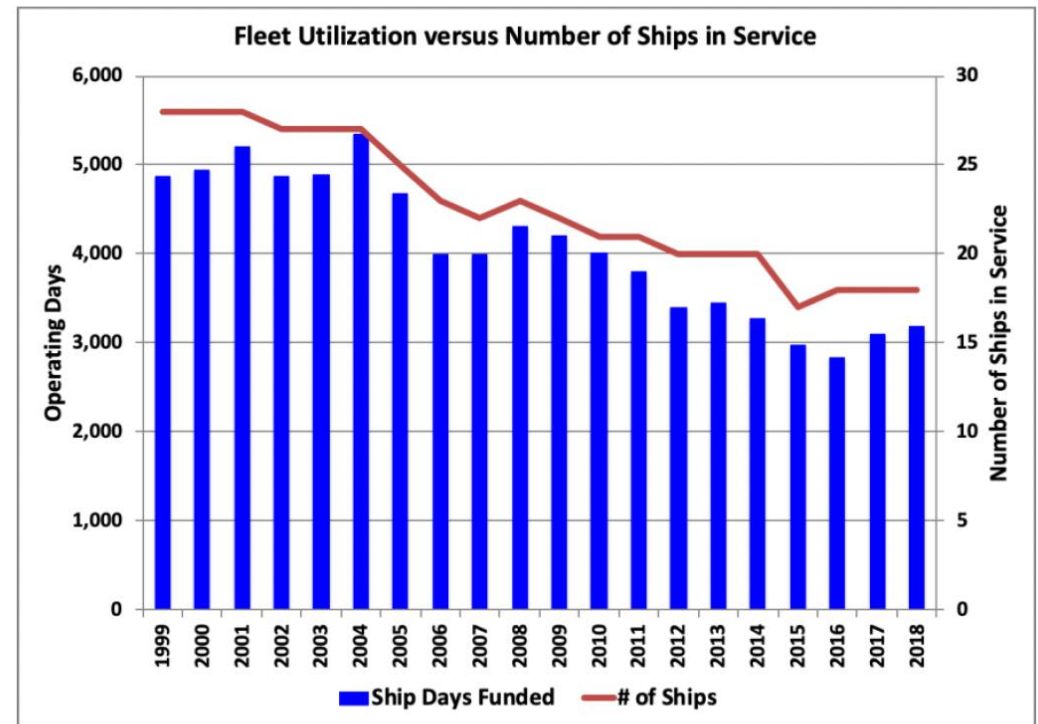


**Figure 5. Chief Scientist Training Workshop.** Chief scientist training workshops cumulative participants and ship time requests submitted.

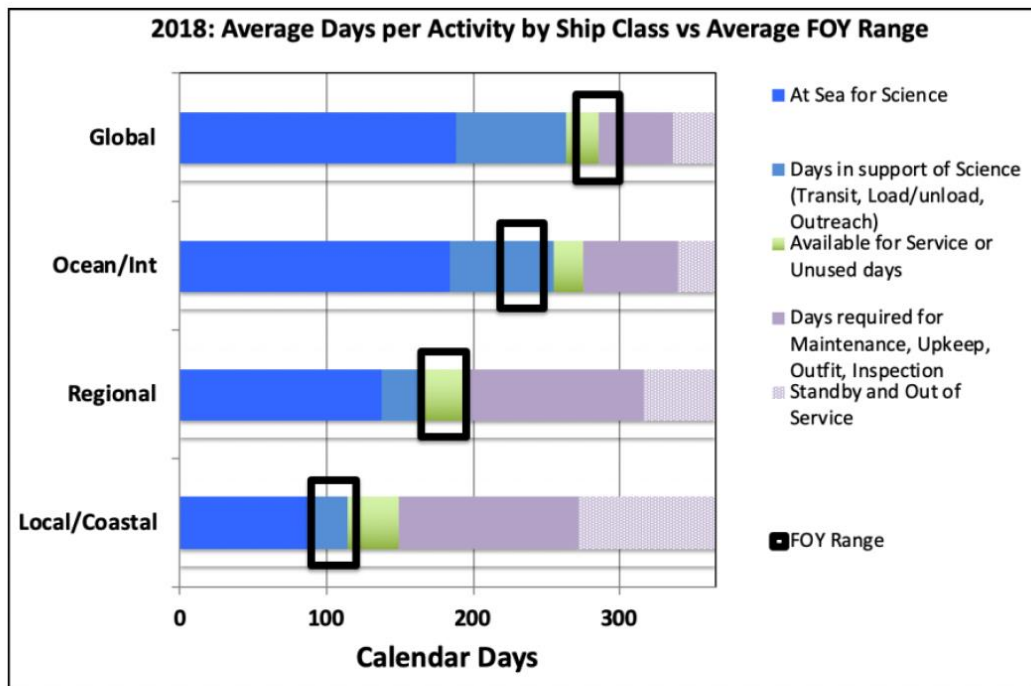
**Table 2. Vessel Specifications.** Vessel particulars compared using examples from each class of the ARF (details of all vessels are available at [www.unols.org](http://www.unols.org)).

| Vessel Class:                                       | Global                | Ocean/<br>Intermediate       | Regional        | Coastal/<br>Local  |
|---|-----------------------|------------------------------|-----------------|--------------------|
| Vessel:   | RV<br><i>Thompson</i> | RV <i>Neil<br/>Armstrong</i> | RV <i>Taani</i> | RV <i>Savannah</i> |
| <b>Dimensions</b>                                   |                       |                              |                 |                    |
| Length overall (ft)                                 | 273                   | 238                          | 199             | 92                 |
| Length waterline (ft)                               | 252.5                 | 230                          | 184             | 82                 |
| Beam (ft)   | 52.5                  | 50                           | 41              | 27                 |
| Draft (ft)  | 17                    | 15                           | 12.5            | 8.5                |
| Displacement full load (LT)                         | 3,528                 | 2,916                        | 1842            | 329                |
| <b>Lab and Science Spaces (fixed)</b>               |                       |                              |                 |                    |
| Main Lab (ft <sup>2</sup> )                         | 1,700                 | 1,023                        | 520             | 308                |
| Wet Lab (ft <sup>2</sup> )                          | 225                   | 398                          | 440             | 158                |
| Hydro Lab (ft <sup>2</sup> )                        | 480                   | -                            | -               | -                  |
| Computer Lab (ft <sup>2</sup> )                     | 600                   | 311                          | -               | -                  |
| Bio Analytical Lab (ft <sup>2</sup> )               | 340                   | -                            | -               | -                  |
| Additional Labs (ft <sup>2</sup> )                  | -                     | 303                          | 465             | -                  |
| Library/Conf RM/Lounge (ft <sup>2</sup> )           | 560                   | 529                          | 195             | 178                |
| Temperature controlled lab space (ft <sup>2</sup> ) | 80                    | 102                          | -               | -                  |
| Science Storage (ft <sup>2</sup> )                  | 1,400                 | 589                          | 165             | -                  |
| Science Hazmat/Chemical Storage (ft <sup>2</sup> )  | 50                    | 57                           | External        | -                  |
| <b>Deck</b>   |                       |                              |                 |                    |
| Aft Deck (incl staging bays) (ft <sup>2</sup> )     | 4,350                 | 3472                         | 2220            | 606                |
| CTD Staging Hanger (ft <sup>2</sup> )               | -                     | 170                          | -               | -                  |
| Side Rail (ft)                                      | 112                   | 80                           | 76              | ~50                |
| Freeboard (ft)                                      | 10                    | 7                            | 6.5             | 5                  |
| Maximum Science Load (LT)                           | 150                   | 250                          | 66              | 10                 |
| 20ft Van Locations (#)                              | 6                     | 3                            | 3               | 0                  |
| <b>Berths</b>                                       |                       |                              |                 |                    |
| Science/Mar techs (#)                               | 38                    | 24                           | 16              | 17                 |
| Crew (#)  | 21                    | 20                           | 13              | 6                  |
| Mobility impaired (#) (within Sci berths)           | 0                     | 1                            | 1               | 0                  |
| <b>Performance</b>                                  |                       |                              |                 |                    |
| Cruise Speed (kts)                                  | 12                    | 11                           | 11              | 8.5                |
| Max Speed (kts)                                     | 15                    | 12                           | 12.5            | 9.5                |
| Range (nm)  | 12,000                | 11,500                       | 5,400           | 2,160              |
| Endurance (days)                                    | 60                    | 40                           | 21              | 26                 |

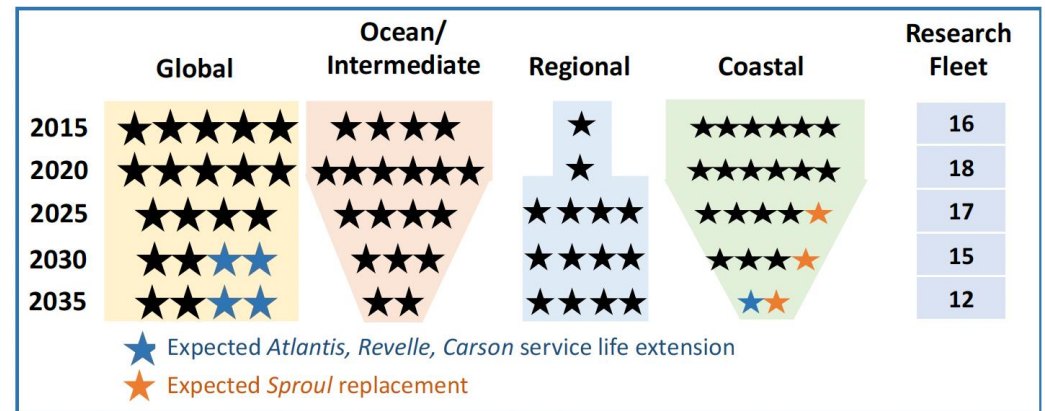
## 2C. Fleet Support, Utilization, and Operational Costs



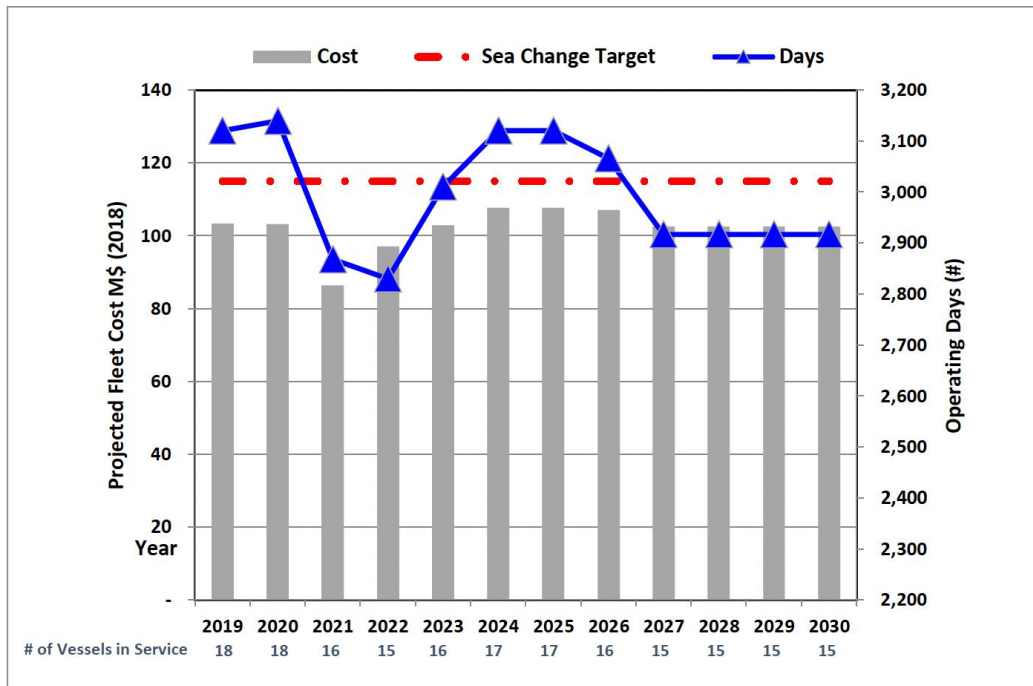
**Figure 10. Fleet Utilization and Number of Vessels.** Academic Research Fleet Utilization v. the Number of Ships in Service.



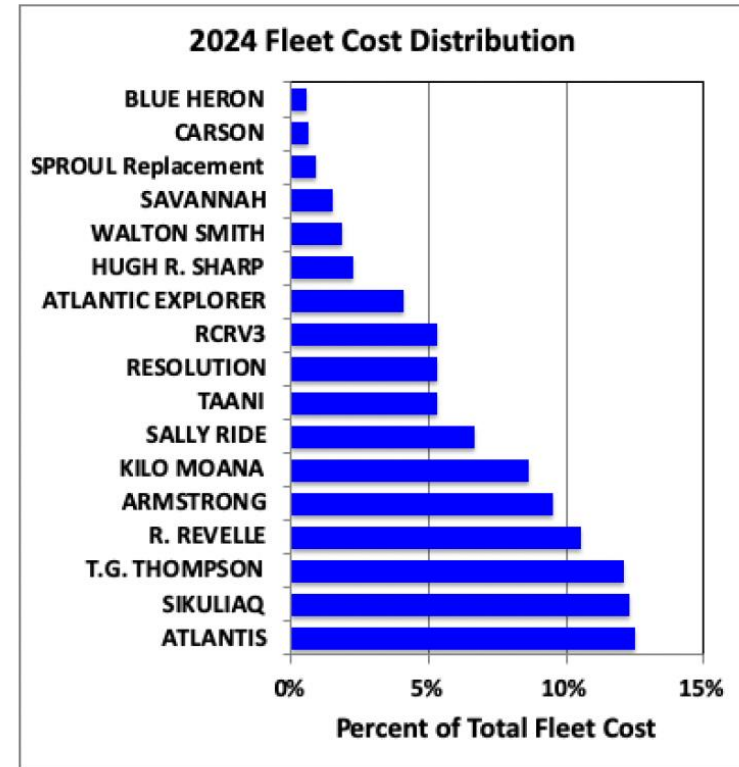
**Figure 11. Fleet Activity by Class.** 2018 Average Days per Vessel Activity by Ship Class versus the Average FOY Range by Class.



**Figure 12. The Academic Research Fleet, Projections by Class.**

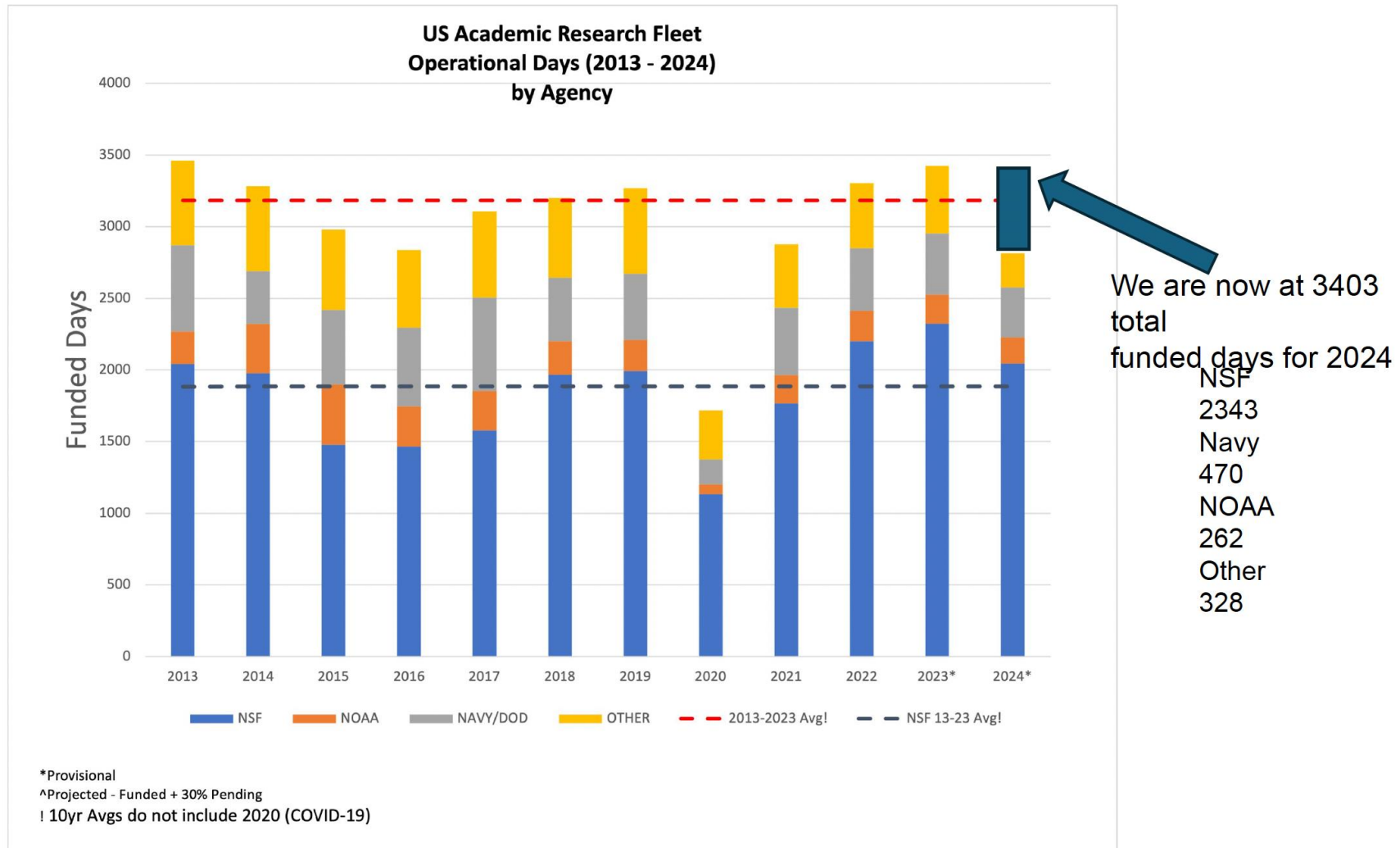


**Figure 13. ARF Projected Costs, Vessels and Operating Days.** Projected costs, operating days and ships in service in the Academic Research Fleet (see text for assumptions leading to these projections) compared to the [Sea-Change report's](#) target value.

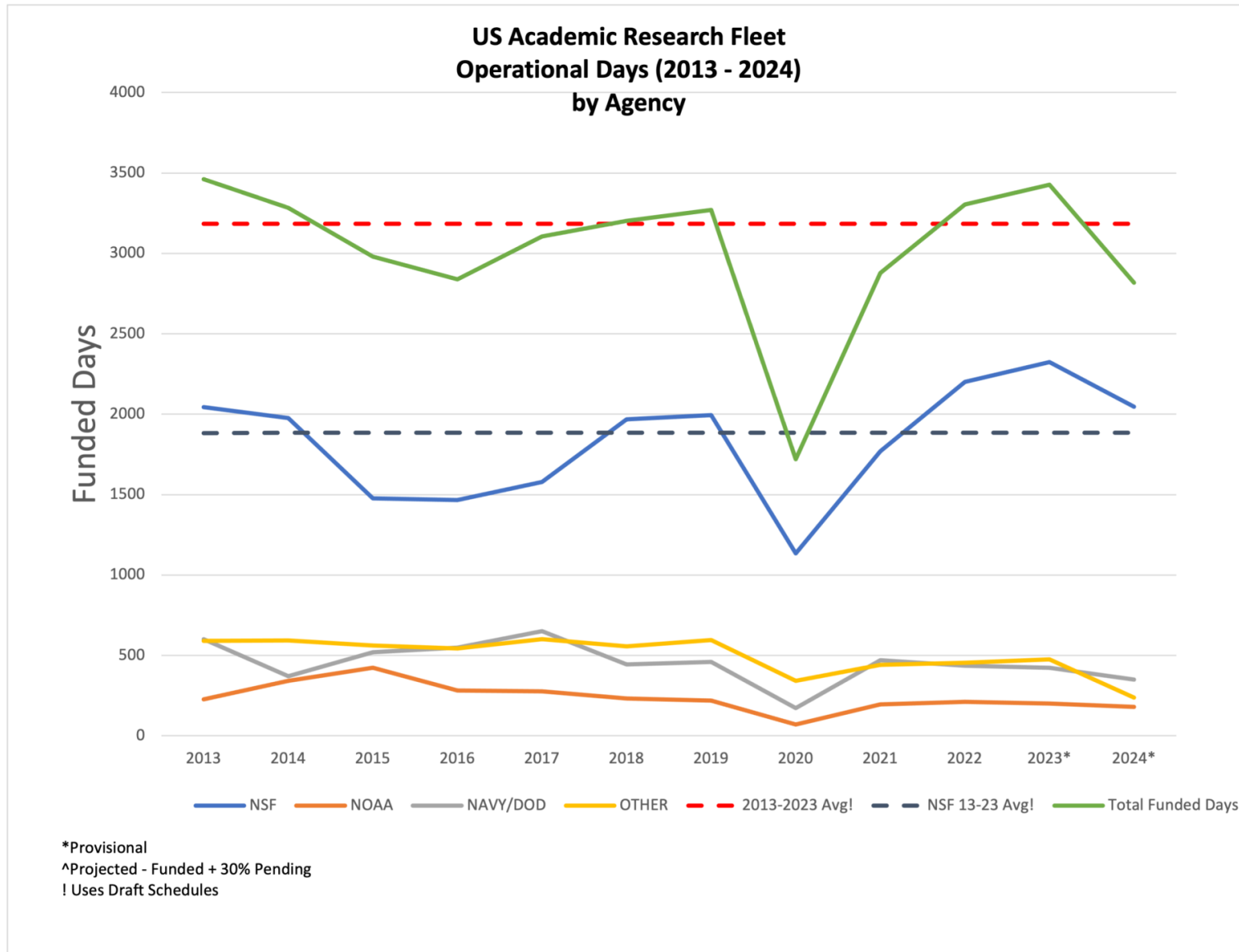


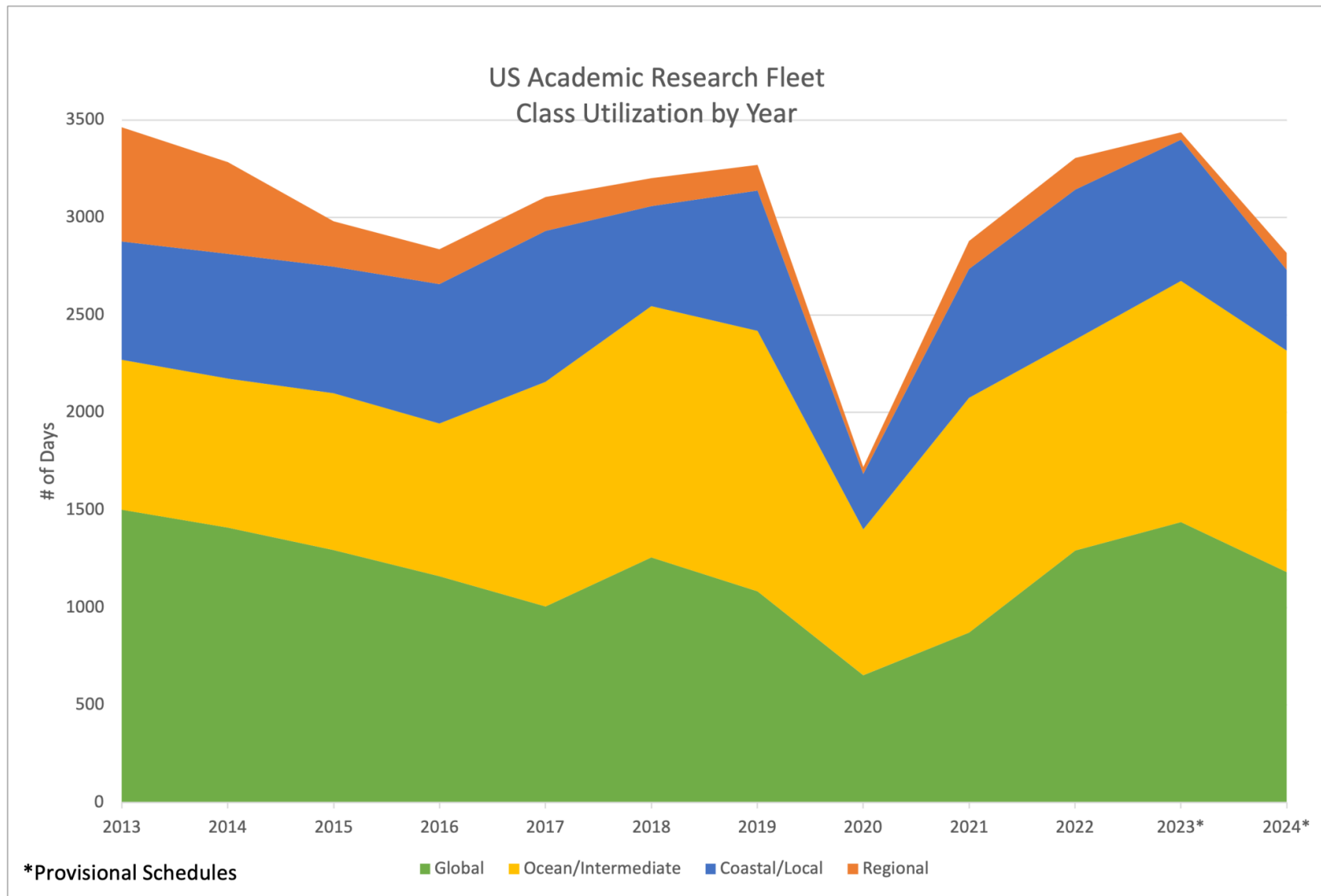
**Figure 14. Fleet Cost Distribution.** Estimated distribution of fleet costs in 2024 under the utilization assumptions described in the text.

# Scheduling Data from Spring Council meeting



# Add'l Scheduling Info – 2023 Annual Mtg





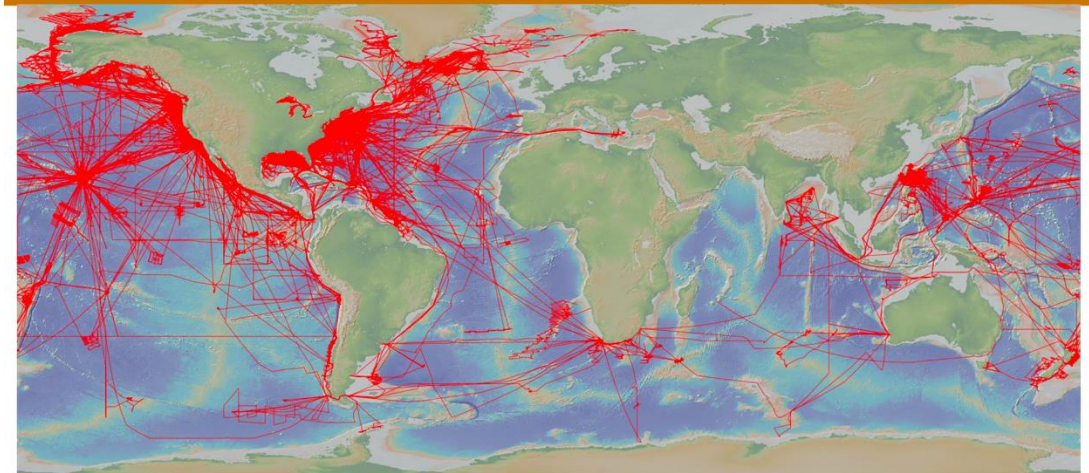


# Data / Info from Decadal Survey UNOLS presentation – Feb 2024

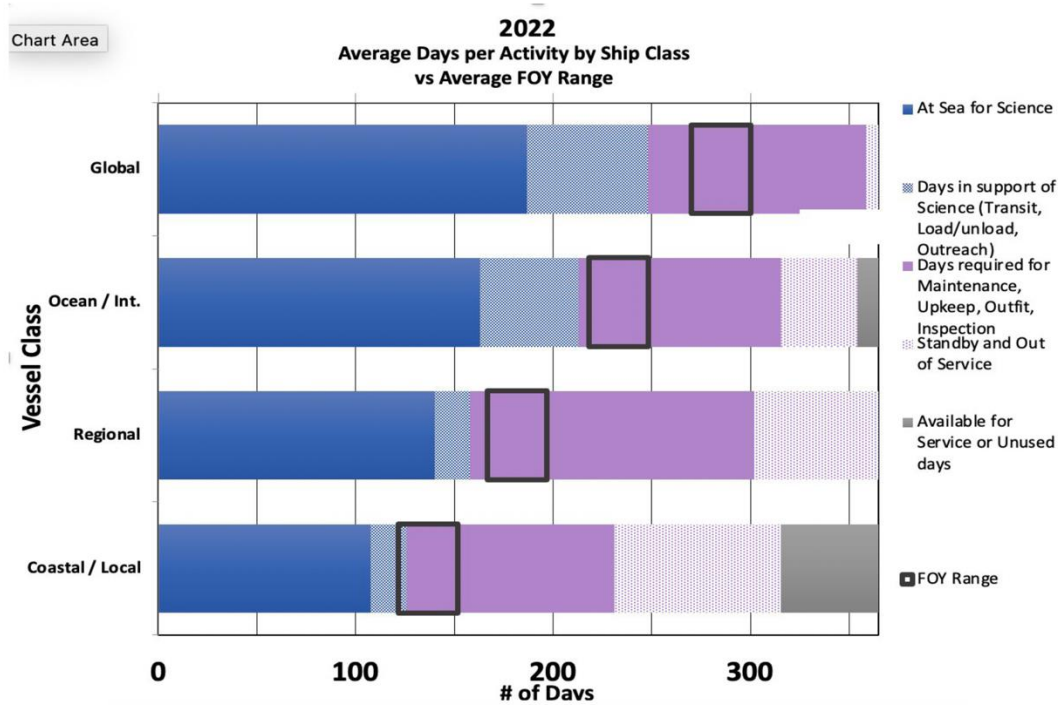
Academic Research Fleet Composition

|              | 1972-2025 |           |           |           |           |           |           |           |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|              | 1972      | 1980      | 1990      | 2000      | 2010      | 2020      | 2023      | 2025      |
| Global       | 8         | 6         | 5         | 6         | 6         | 5         | 5         | 5         |
| Ocean        | 0         | 0         | 0         | 0         | 1         | 3         | 3         | 3         |
| Intermediate | 6         | 8         | 9         | 7         | 5         | 2         | 1         | 0         |
| Regional     | 2         | 2         | 3         | 3         | 4         | 2         | 2         | 5         |
| Coastal      | 7         | 5         | 6         | 7         | 3         | 3         | 3         | 2         |
| Local        | 12        | 6         | 4         | 5         | 4         | 3         | 3         | 3         |
| <b>Total</b> | <b>35</b> | <b>27</b> | <b>27</b> | <b>28</b> | <b>23</b> | <b>18</b> | <b>17</b> | <b>18</b> |

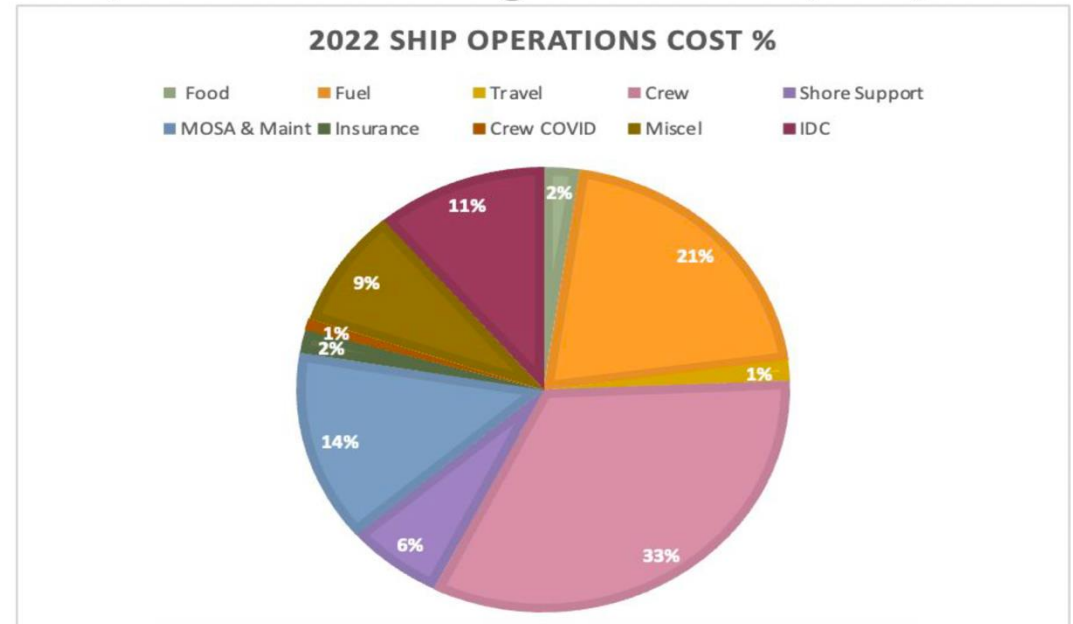
Where has the fleet been used? 2009-2024



# ARF Full Optimal Year



# Prospective on what goes into Ship Day Rate



| SHIP/CLASS                      | BUILT | Owner   | LOA m(ft) | Science Berths | Total Ship Days Used (2022) | Ship Operation + Tech Day Rates | 2016        | 2017          | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | End Year |    |  |
|---------------------------------|-------|---------|-----------|----------------|-----------------------------|---------------------------------|-------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|----|--|
|                                 |       |         |           |                |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |          |    |  |
| <b>Global Class</b>             |       |         |           |                |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |          |    |  |
| <i>Thomas G. Thompson</i>       | 1991  | NAVY    | 84 (274)  | 36             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2036 |      |      |          |    |  |
| <i>Roger Revelle</i>            | 1996  | NAVY    | 84 (274)  | 37             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2041 |      |      |          |    |  |
| <i>Atlantis</i>                 | 1997  | NAVY    | 84 (274)  | 37             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2042 |      |      |          |    |  |
| <i>Marcus G. Langseth</i>       | 1991  | LDEO    | 71 (235)  | 35             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2025 |      |      |          |    |  |
| <i>Sikuliaq</i>                 | 2014  | NSF     | 80 (261)  | 26             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2045 |      |      |          |    |  |
| <i>Total in Class</i>           |       |         |           |                |                             |                                 | 5           | 5             | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    |          |    |  |
| <b>Ocean/Intermediate Class</b> |       |         |           |                |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |          |    |  |
| <i>Kilo Moana</i>               | 2002  | NAVY    | 57 (186)  | 29             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2032 |      |      |          |    |  |
| <i>Endeavor</i>                 | 1976  | NSF     | 56 (185)  | 18             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2022 |      |      |          |    |  |
| <i>Atlantic Explorer</i>        | 1982  | BIOS    | 51 (168)  | 20             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2026 |      |      |          |    |  |
| <i>Neil Armstrong</i>           | 2015  | NAVY    | 73 (238)  | 24             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2045 |      |      |          |    |  |
| <i>Sally Ride</i>               | 2015  | NAVY    | 73 (238)  | 25             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2046 |      |      |          |    |  |
| <i>Total in Class</i>           |       |         |           |                |                             |                                 | 5           | 5             | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 4    | 4    | 3    | 3    | 3    | 3    | 3    | 3    | 2    | 2    | 2    |          |    |  |
| <b>Regional Class</b>           |       |         |           |                |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |          |    |  |
| <i>Hugh R. Sharp</i>            | 2005  | UDel    | 44 (146)  | 14             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2035 |      |      |          |    |  |
| <i>Taani</i>                    | 2024  | NSF     | 60 (199)  | 16             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2054 |      |      |          |    |  |
| <i>Narragansett Dawn</i>        | 2025  | NSF     | 60 (199)  | 16             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2055 |      |      |          |    |  |
| <i>Gilbert R. Mason</i>         | 2025  | NSF     | 60 (199)  | 16             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2055 |      |      |          |    |  |
| <i>Total in Class</i>           |       |         |           |                |                             |                                 | 1           | 1             | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 2    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    |          |    |  |
| <b>Coastal/Local Class</b>      |       |         |           |                |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |          |    |  |
| <i>Robert Gordon Sproul</i>     | 1981  | SIO     | 38 (125)  | 12             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2025 |      |      |          |    |  |
| <i>Pelican</i>                  | 1985  | LUMCON  | 36 (116)  | 14             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2025 |      |      |          |    |  |
| <i>Walton Smith</i>             | 2000  | U.Miami | 30 (96)   | 16             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2030 |      |      |          |    |  |
| <i>Savannah</i>                 | 2001  | SkIO/UG | 28 (92)   | 19             |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2031 |      |      |          |    |  |
| <i>Blue Heron</i>               | 1985  | UMINN   | 26 (86)   | 6              |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2030 |      |      |          |    |  |
| <i>Rachel Carson</i>            | 2003  | UW      | 22 (72)   | 9              |                             |                                 |             |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2033 |      |      |          |    |  |
| <i>Total in Class</i>           |       |         |           |                |                             |                                 | 6           | 6             | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 4    | 4    | 4    | 4    | 4    | 4    | 2    | 1    | 1    | 0    | 0        |    |  |
| <b>TOTAL NUMBER OF VESSELS</b>  |       |         |           |                |                             |                                 | 17          | 17            | 17   | 17   | 17   | 17   | 17   | 17   | 17   | 17   | 17   | 16   | 15   | 15   | 15   | 15   | 15   | 13   | 12   | 11   | 10       | 10 |  |
|                                 |       |         |           |                |                             |                                 | Design Life | Extended Life |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |          |    |  |

# 2023 Annual Meeting Scheduling Info

